



RARITAN PLAZA #1
4TH FLOOR
RARITAN CENTER
EDISON, NEW JERSEY 08837
PHONE: 908-225-3990
FAX: 908-225-3240

22 March 1993

Ms. Christina H. Purcell, Case Manager
New Jersey Department of Environmental
Protection and Energy
Division of Hazardous Waste Management
Bureau of Federal Case Management
CN 028
Trenton, New Jersey 08625-0025

W.O. No. 06720-008-001-0001

RE: L.E. CARPENTER ROCKAWAY RIVER SEDIMENT ECOLOGICAL
ASSESSMENT RESPONSE TO COMMENTS DATED 3 FEBRUARY 1993

Dear Ms. Purcell:

On behalf of our client, L.E. Carpenter, Roy F. Weston, Inc. (WESTON®) is pleased to present eight copies of the Final Rockaway River Sediment Ecological Assessment (Ecological Assessment) for the L.E. Carpenter site in Wharton, New Jersey and respond to your comments dated February 3, 1993. The Ecological Assessment concluded that site conditions are not impacting the biological community in the sediment or water environments of the Rockaway River. As a result, no further investigation is warranted, nor will a remedial action program specific to the Rockaway River sediment be required.

Although your letter indicated that a revised document was not required, it was felt that due to the detailed nature of several of the comments, a revision of the document was warranted to properly address all of the issues raised by the reviewers. The revisions do not affect the conclusions of the document, but rather they serve to clarify several issues which were confusing as a result of a typographical error presented in one of the data tables.

In general, the comments fell into one of the following three categories:

- 1) typographical and/or grammatical errors;
- 2) technical comments regarding a specific statement, phrase or section; or
- 3) technical comments regarding conclusions or broad issues.

All comments of the first category were addressed in the revised report as specified. A map of the study area depicting the L.E. Carpenter Site, the Rockaway River, sampling locations, and the salient features has been superimposed on an aerial photograph of the study area, and a bibliography listing all cited literature has been included. The attached summaries present responses to the individual comments provided by USEPA Region 2.





Ms. Christina Purcell
NJDEPE

-2-

22 March 1993

If you have any questions or require further information, please contact me at (908) 225-3990.

Very truly yours,

ROY F. WESTON, INC.



Martin J. O'Neill, CHMM
Project Director

cc: C. Anderson, L.E. Carpenter & Co.
R. Hahn, L.E. Carpenter & Co.

**Response to Comments by USEPA, Surveillance and Monitoring Branch
Rockaway River Ecological Assessment for L.E. Carpenter and Company**

These comments focus on the degree of site-related biological impairment, the conclusion that there are no site-related impacts, and the utility of reference locations. It is our opinion that the interpretation of the biological data and conclusions regarding the nature and degree of site related impacts revolve around the issue of a point of reference.

The report discusses the biological communities at the reference locations (1 and 2) and the adjacent and downstream locations (2 through 6) within the framework of the habitat and resources available to benthic organisms. It was acknowledged in preplanning discussions with the NJDEPE and in the Work Plan that the reference locations were dissimilar to locations adjacent to and downstream of the site. Dissimilarities included morphological characteristics of the stream channel and modifications in water quality as a result of the Washington Forge Pond. It was further acknowledged that the presence of the Washington Forge Pond complicates matters and somewhat disconnects location 1 from the continuum of physical/chemical/biological conditions present at locations 2 through 6. Nevertheless, it was agreed that the proposed locations were sufficient in terms of their collective ability to represent the best attainable biological condition for the Rockaway River basin in general and the study area in particular. Similarities of significance include historical regional stress such as mining activities, as well as a common source of potential colonizing organisms.

The primary result of the investigation was that there are no site-related impacts. This conclusion was based on the biosurvey data and the Rapid Bioassessment Protocol (RBP) III. As discussed in the report, there were differences between the biological communities upstream and downstream of the site. The differences were reflected in not only the number of taxa, but in the types of organisms collected. It is important to note that the mere presence of differences does not imply ecological impact. Rather, as in this case, it points out that the biological community is responding to changes in the habitat and resources. It is extremely important to integrate the presence and effects of the Washington Forge Pond into the analysis of the biological data. The observation that there are no site related impacts is a subjective conclusion (as are most interpretations of biological data), but is strongly based on an objective evaluation of the biosurvey and habitat assessment as per the RBP III. Prominent results in support of this argument include the following:

- 21 taxa were collected immediately upstream of the site (location 2) whereas 25 to 29 taxa were collected adjacent to and downstream of the site.
- The community immediately upstream of the site (location 2) was dominated by a functional feeding group specifically adapted to filtering suspended materials from the water column. The dominance of this group was in direct response to

the release of water from the Washington Forge Pond dam. As indicated by the citations in the report, this is a well documented phenomenon.

- The community adjacent to and downstream of the site increased in taxonomic and functional diversity relative to location 2. Filter feeding organisms continued to dominate; however, other groups (i.e.; gatherers) increased in abundance as a direct result of the available resources.

A typical biological response to toxins in the environment is the elimination of sensitive or intolerant community components. This was not generally observed in the study area. Note the following: only 2 taxa that were collected at location 1 were not collected at any downstream location; only 3 taxa that were collected at locations 1 and 2 were not collected at any downstream location; only 3 taxa that were collected at location 2 were not collected at any downstream location. The taxa discussed above were, without exception, minor components of the respective communities. Their rarity suggests that the study area may be at the edge of their geographic range or niche breadth. This distribution pattern is consistent with the mechanisms (i.e.; habitat and resource exploitation) discussed in the report and is based on geographical patterns of resource exploitation, and closely fits other paradigms of community organization.

As mentioned above, the selection of a reference location in the study area was difficult. Ideally, the closest upstream location with similar aquatic and riparian habitat is selected. Community structure and function at locations adjacent to and downstream of a site are compared to the reference and shifts in community attributes are attributed to site related factors. The Rockaway River upstream, adjacent to, and downstream of the site has been described in the report and represents a unique assortment of habitat types. Additionally, non-site related sources of anthropomorphic stress (i.e.; historic mining activities, residential development, and industrial and commercial establishments) are present in the drainage areas that were necessary to incorporate into the design of the study. Independently, neither location 1 or 2 represent an ideal reference location. Prior to their selection, however, options were explored including the use of a reference location within a comparable ecoregion (or at a location further removed from the site) and the use of existing data. An example of the latter would include USGS and USEPA ambient water quality monitoring results. These options were not exercised for a number of reasons. First, macroinvertebrate communities reflect habitat differences on a scale smaller than other aquatic organisms (i.e.; fish) and are therefore best suited to site-specific assessments. Within an ecoregion, stream or stream segments may reflect characteristics not typical of the study area including riparian vegetation and form, flow and size. Data collected from various portions of the ecoregion may not be compatible with the study area, and therefore are not useful as a reference. Secondly, basin or area-specific stressors that are of significance to a site analysis, such as performed at the L.E. Carpenter site, are not likely to be reflected into either an entire ecoregion or database of macroinvertebrates. Finally, seasonal factors may exclude the use of or otherwise obscure differences between sampling locations.

As stated previously, neither location 1 or 2 independently represent an ideal reference location.

The various characteristics of all locations are described in detail in the report. The biotic condition observed at location 1 represents the best attainable biological condition for locations adjacent to and downstream of the site as modified by the characteristics of location 2. These are significant and extensive and include modifications in nutrient dynamics, thermal regimes, and flow. Consequently, the biological condition of locations downstream of the pond are not likely to be similar to location 1. However, as discussed above, most community components (both taxonomically and functionally) present upstream are also present downstream, but in a relative abundance consistent with downstream conditions and stream ecosystem theory. Impairment, as discussed in the report, is a relative term that is only applicable in comparison to either location 1 and/or location 2 within the framework of the RBP III. The biological community at locations downstream of either reference are clearly not impaired, but responding to a continuum of habitat conditions (primarily nutrient and resource availability). This observation alone is suggestive of a robust macroinvertebrate community that shows no impairment from chemical constituents.

The mechanisms responsible for the observed distribution and abundance of macroinvertebrates have been identified and discussed in the report. Clearly, there will always be a certain degree of uncertainty associated with the interpretation of field survey data; however, as discussed above, the data strongly indicates that the macroinvertebrate community is not impaired by site conditions, but is strongly influenced by other manmade features. Based on the findings of this study, additional investigations into the Rockaway River focusing on the L.E. Carpenter site are not warranted at this time.

**Response to Comments by USEPA Technical and Pre-remedial Support Section
Rockaway River Ecological Assessment for L.E. Carpenter and Company**

General: The organization of the report precisely follows the outline of the Work Plan which was approved by the NJDEPE prior to the initiation of the study, as well as other accepted guidelines for scientific documents (i.e.; *Society of Environmental Toxicology and Chemistry Guide for Authors*). The sequence of the biological survey placed the quantitative events (i.e.; riffle area sample) ahead of the qualitative events (i.e.; coarse particulate organic matter and periphyton sampling).

1) The reviewers are correct in stating that the supplementary guidance series to the Risk Assessment Guidance for Superfund (the "ECO Updates") were not cited in the report. Nor have they been cited in other relevant literature including the *Framework for Ecological Risk Assessment* (USEPA, 1992), *Ecological Risk Assessment* (Suter, 1993) or *Freshwater Biomonitoring and Benthic Macroinvertebrates* (Rosenberg and Resh, 1993). The ECO Updates are intended to provide general guidance to EPA and other government employees. Due to the general nature of their contents and the availability of detailed technical guidance elsewhere (i.e.; the primary literature as well as government publications), ECO Updates are not likely to be widely cited.

2) The sentence has been revised as requested.

3) The authors apologize for the typographical errors cited. Values in the final edition of Table 5 were shifted one row; the values in the text were correct as written.

4) The revisions have been incorporated as requested.

5 a, b, c, and d) The sentences have been revised as requested.

6 a and b) The revisions have been incorporated as requested.

✓ 7 a) The sum of taxonomic groups is 27, not 26, as suggested by the reviewers; see Table 9.

7 b) Table 9 was corrected, *Gammarus* was numerically dominant at location 3.

7 c) Table 9 was corrected, the text is correct as written.

7 d) The second sentence refers to Table 10 and is correct as written. The next-to-last sentence has been revised as requested.

8) The sentence has been revised as requested.

9 a and b) The revisions have been incorporated as suggested.

10) Table 5 was corrected as described in response to Comment 3; the text now follows.

11) Paragraph 7 indicates that the community at locations 4 and 5 were codominated as at location 1, but with a slightly higher percentage of gatherers. Filterers, gatherers and shredders codominated at location 1, as stated two sentences prior.

12) The statement is supported by Table 5.

13) The sentence has been rewritten to simplify and eliminate extraneous wording. The point of the sentence is based on the concept of a river continuum (Vannote et al., 1980). Simply stated, river systems represent a continuous and somewhat predictable gradient of conditions. As a headwater stream matures into a larger stream and then into a large river, biotic and abiotic conditions change (i.e., flow, energy form and basis). In response, the macroinvertebrate community (as well as other communities) changes in composition and function. Within a relatively small reach, such as the portion of the Rockaway River studied, biotic and abiotic conditions should not change, and therefore, the macroinvertebrate communities at various locations within this reach should not change. Changes in composition and function of the macroinvertebrate community between locations, therefore, are a reflection of the conditions at that location as well as upstream locations. If conditions within a reach are similar and the community changes significantly (with respect to composition and function), it is likely that external factors, such as contaminants, are determining mechanisms.

14 a) The page has been reviewed and revisions to correct grammatical errors have been incorporated. The specified sentence has been revised as requested.

14 b) Table 5, as corrected, was used for the basis of the second sentence. The third sentence which emphasizes several numerically dominant filter feeders, was based on Table 4. Neither Chironomidae or *Cheumatopsyche* appear in Table 5. Table 5 is a representation of functional types which are independent of taxonomy. Substitution of Chironomidae for *Cheumatopsyche* is not appropriate due to the wide taxonomic and ecological differences between these groups.

15 a) The suggested revision has been incorporated in the first paragraph. Collectors is correct in the next-to-last sentence; the Table was corrected.

16) The sentence has been rewritten in a simpler style. The sentence highlighted the fact that it appears that the benthic community would not likely be substantially different in the absence of historic disturbance; other, more current, habitat limitations are the overriding determinants of community structure and function.

- 17) Reference locations (1 and 2) were not precisely identical to adjacent and downstream locations in terms of biotic and abiotic factors. The rationale behind the selection of sampling locations and the interpretation of the data has been justified in preplanning discussions with the NJDEPE, the Work Plan, the Ecological Assessment report, and this communication. It appears the reviewers are concerned with a reference to location 2 as a "downstream" location. Location 2 is a downstream location with respect to location 1. The specified paragraph was a discussion that underscored the differences between location 1 and all other locations, including location 2. Elsewhere in the report (i.e.; page 2-2, next-to-last paragraph) location 2 is discussed in terms of the site and is therefore referred to as an upstream location.

References:

Rosenberg, D.M. and V.H. Resh, 1993. *Freshwater Biomonitoring and Benthic Macroinvertebrates*, Chapman and Hall, New York, 488 pp.

Suter, G.W., 1993. *Ecological Risk Assessment*, Lewis Publishers, 538 pp.

USEPA, 1992. *Framework for Ecological Risk Assessment*, EPA/630/R-92-001, Risk Assessment Forum, Washington, D.C.

Vannote, R.L., G.W. Minshall, K.W. Cummins, J.R. Sedell, and C.E. Cushing, 1980. "The River Continuum Concept," *Canadian J. Fish Aqu. Sci.*, 37:130-7.